

**Welcome to IE579 Fall 2018 class**

**Instructor:** Professor Shimon Y. Nof ([nof@purdue.edu](mailto:nof@purdue.edu)) Office: GRIS 243  
Office hours: Open door policy, and by email  
Email: Please send all class related email to BOTH instructor and TA, beginning the subject line with **IE579**

**TA:** TBA TA's Office hours: Will be posted on Blackboard, and by email.

**Lectures:** MWF 2:30-3:20 PM WANG 2599 **Web:** blackboard.purdue.edu

**Course Objective:** Learn to design and control production/mfg/supply/service systems through a science-based understanding of production system operations and flow.

**Course Description:** To achieve cost-effective, competitive and sustainable production/mfg./supply/service systems, a thorough understanding of their operations and flow are essential. We focus on the fundamental understanding of the factors affecting operational performance. We will discuss the basic models and techniques of supply and inventory control, queuing analysis, job scheduling, and supply networks, and their role in the context of analytics and informatics (A&I).

**Course Topics:** Supply and inventory control - EOQ model, dynamic lot-sizing, dynamic lot-sizing in supply networks, news vendor model, base stock model, (R,Q) and (s,S) models; Queuing flow analysis - M/M/1, M/M/s, M/M/s/k, M/G/1, G/M/1, Multi-class queues, Queuing networks; Scheduling - single machine, parallel machines, flow shops, job shops, supply decision networks; cyber physical and cloud-based production and manufacturing; cyber-collaborative production control.

**Pre-requisites:** Basic concepts of production control and undergraduate-level statistics and optimization.

**Textbook:** No textbook required. Three Reference Books: 1. W. J. Hopp and M.L. Spearman, "Factory Physics," McGraw-Hill, 2008 or later. 2. M. Pinedo, "Scheduling: Theory, Algorithms and Systems," Springer, 2008 or later; 3. M. Moghaddam and S.Y. Nof "Best Matching Theory and Applications," Springer, 2017.

**Class Notes:** Class notes will be posted on Blackboard system usually before the class.

**Homework:** Approximately 6 assignments will be posted through the Blackboard system.

**Exams:** 2 exams; Final project in lieu of final exam.

**Project:** Write a research report as a team. The focus topic of this semester will be *the quantitative modeling and analysis of production, manufacturing, or service systems with collaborating humans and robots*. Students will work in teams of two or three. This project involves a formal technical report and presentation. Further details will be defined early in the semester. Develop your project in two phases:

1. *Proposal:* Introduction / Problem definition / Literature survey.
2. *Report:* Introduction (rev.) / Problem definition (rev.) / Literature survey (rev.) / Analytic methodology / Experimentation / Analyses and evaluation / Conclusions.

The best projects will be presented in class by the project teams.

**Grading:** HW (25%), Exams 2x (25%), Project (25%). Grading on a curve; +/- will NOT be applied.

**Purdue's Honor Pledge**

***"As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue."***

Each student will be asked to sign this pledge in our Homework A.

**Campus emergencies:**

Review current emergency procedures at: [https://www.purdue.edu/ehps/emergency\\_preparedness/](https://www.purdue.edu/ehps/emergency_preparedness/)